APPLICANT'S NAME: NORTHROP GRUMMAN SPACE AND MISSION SYSTEMS CORP.

FACILITY PERMIT ID# 800409

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PERMIT TO CONSTRUCT

Title V Permit Revision
Application No. 509946

Equipment Description:

PROCESS 7: EXTERNAL COMBUSTION					
System 1: Boilers					
Equipment	Device ID	Connected To	Source Type/ Monitoring Unit	Emissions	Equipment Specific Conditions
BOILER, NATURAL GAS, CLEAVER BROOKS, MODEL FLX-700, 7.0 MM BTU/HR, WITH FLUE GAS RECIRCULATION WITH Reference A/N 517347 BURNER, NATURAL GAS, INDUSTRIAL COMBUSTION, LOW NOX, MODEL NTH070NGX-9S-4P, 7.00 MMBTU/HR	D337		NOX: PROCESS UNIT	**CO:2000PPMV (5A)[RULE 407, 4-2-1982]; 100 PPMV NATURAL GAS(4)[RULE 1303(a)(1)-BACT, 12-06-02; CO: 400 PPMV NATURAL GAS(5)[Rule 1146, 9-5-2008]** **NOX: 9 PPMV NATURAL GAS(3)[RULE 2012, *2012, 5-6-2005*] NOX: 9 PPMV NATURAL GAS(4)[RULE 2005, *5-6-2005;* PM: 0.1 GRAINS/SCF (5)[RULE 409, 8-7-1981]**	D28.1, D182.3, D332.1,I296.1, L341.1

RECOMMENDATION
A Permit to Construct is recommended for application numbers 517347 subject to the following conditions:

D28.1THE OPERATOR SHALL CONDUCT SOURCE TEST(S) IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS:

The test shall be conducted within the first 12 months after the issuance of this permit and once every 5-year period with the first 5-year period ending xx-xx-200x.

The test shall be conducted to demonstrate compliance with the source testing requirements of Rule 2012 for a Process Unit opting to comply with a NOx concentration limit.

D182.3THE OPERATOR SHALL TEST THIS EQUIPMENT IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS:

Source testing shall be conducted within 180 days after the initial start-up unless otherwise approved in writing by the Executive Officer.

The source tests shall be performed to verify compliance with the NOx and CO emission limits specified by this permit.

The tests shall be conducted while the burner is firing at maximum, minimum, and average firing rates.

Written notice of the source tests shall be submitted to the District (addressed to South Coast Air Quality Management District, P.O. Box 4941, Diamond Bar, CA 91765) at least 14 days prior to testing so that an observer can be present.

Two complete copies of the source test reports shall be submitted to the District (South Coast Air Quality Management District, P.O. Box 4941, Diamond Bar, CA 91765) within 45 days after the test. The report shall include, but may not be limited to emission rates in pounds per hour and concentrations in ppmv at the outlet of the boiler, measured on a dry basis at 3% oxygen. The following operating data shall also be included for each firing rate:

_ A. The exhaust flow rates, in actual cubic feet per minute (ACFM)._
_ B. The firing rates, in BTU per hour._
_ C. The exhaust temperature, in degrees F._
_ D. The oxygen content of the exhaust gas, in percent._
_ E. The fuel flow rate._

A testing laboratory certified by the California Air Resources Board in the required test methods for the criteria pollutants to be measured, and in compliance with District Rule 304 (non conflict of interest) shall conduct the test.

Sampling facilities shall comply with the District Guidelines for Construction of Sampling and Testing Facilities, pursuant to Rule 217._

D332.1 The operator shall determine compliance with the CO emission(s) limit by conducting a source test at least every five years using a portable analyzer and AQMD-approved test method or, if not available, a non-AQMD approved test method. The test shall be conducted when the equipment is operating under normal conditions to demonstrate compliance with the CO concentration limit(s). The operator shall comply with all general testing, reporting, and recordkeeping requirements in Section E and K of this permit.

I296.1 This equipment shall not be operated unless the operator demonstrates to the Executive Officer that the facility holds sufficient RTCs to offset the prorated annual emissions increase for the first compliance year of operation. In addition, this equipment shall not be operated unless the operator demonstrates to the Executive Officer that, at the commencement of each compliance year after the first compliance year of operation, the facility holds sufficient RTCs in an amount equal to the annual emissions increase.

L341.1 Within 7 days after the start-up of this equipment, the following device(s) shall be removed from operation:

D91

Background:

Northrop Grumman Space & Mission Systems is engaged in the development and manufacture of advanced semiconductors and printed circuit boards including fabrication and assembly of electronic components and hardware for integration into satellite and space vehicle. The Company also conducts research and development relating to chemical lasers, rocket engine thrusters and energy related programs for commercial and non-commercial applications. The operations are currently performed at three major sites within the South Coast Air Basin and they are: Capistrano Test Site (CTS), Redondo Beach and Manhattan Beach.

This application was received by the District on 12/21/10 as a new construction of a 7.0 mmbtu/hr low-NOx boiler to be located at the Redondo Beach Title V facility under ID# 800409. The new 7.0 mm btu/hr boiler is a Cleaver Brooks, model FLX 700, water tube type boiler. The low-Nox burner is fully modulated with flue gas recirculation. It is expected to comply with the

BACT requirements of 9 ppmv NOx and 100 ppmv CO. Northrop Grumman Space & Mission Systems is requesting a permit to construct to install this boiler which will replace the existing 6.5 mmbtu/hr boiler D91. The boiler will be used to heat and adjust the humidity of the air in the building M1 for the purpose of providing comfort to personnel working in the building and also for controlling the temperature & humidity of clean rooms. The boiler is expected to operate 24 hours per day, 7 days per week and 52 weeks per year.

Compliance Update:

The District records indicate that during the last five years Northrop Grumman was issued two Notices to Comply (NC). Notice NCD23904 was issued on 5/21/2009 for failure to repair and maintain the pH meter for the scrubber C162. The second notice NC D23906 was issued on 5/28/2009 for the following:

tank 31, D291 - locate or install amp-hr meter
tank 85, D323 - install temperature gauge
D329 - comply with or apply for change of condition to C6.13
D330 - comply with or apply for change of condition to C6.12
Post the Permit

These issues have been resolved and Northrop is now in full compliance. There are no other Notices of Violation, Notices to Comply or Complaints issued against this facility as of 1/31/11.

Emissions Calculations:

@ 100 ppmv CO = 77.385 lb CO/mmcuft
@ 9ppmv NOx = 11.66 lb NOx/mmcuft
Rating = 7.0 mmbtu/hr
Operating schedule: 24 hrs/day, 7 days/week 50 weeks/year.

7.0mmbtu/hr = 0.00667 mmcf/hr

	Emission Factor lbs/mmcft	Hourly Emissions lbs/hr	Daily Emissions lbs/day	Annual Emissions lbs/yr	30 day average lbs/day
ROG	7.0	0.047	1.12	407.68	1.0
NOX	11.66	0.078	1.87	679.08	2.0
SOX	0.83	0.005	0.13	48.34	0.0
CO	77.39	0.516	12.38	4,507.19	12.0
PM10	7.5	0.05	1.20	436.8	1.0

	Previous emissions from D91(a/n 240266)		New Emissions from a/n 517347		Net Gain/Loss
	Hourly Emissions lbs/hr	Daily Emissions lbs/day	Hourly Emissions lbs/hr	Daily Emissions lbs/day	Daily Emissions lbs/day
ROG	0.0108	1.0396	0.047	1.12	+0.0804
NOX	0.0556	5.3419	0.078	1.87	-3.472
SOX	0.0013	0.1233	0.005	0.13	+0.0067
CO	0.2066	19.8288	0.516	12.38	-7.449
PM10	0.0116	1.114	0.05	1.20	+0.086

The overall outcome with the replacement of the 6.5 mm btu/hr device D91 with a larger 7.0 mm btu/hr Cleaver Brooks boiler are reductions in the NOx and CO emissions with negligible increases in the ROG, Sox and PM10 emissions. This is the result of current lower NOx and CO requirements.

Risk Assessment:Rule 1401

Toxic emissions from external combustion subject to Reg 14
Based on the Risk assessment performed using the Risk Assessment Module, this boiler passed Tier 2 modeling. The MICR values were determined to be 3.58E-07 and 3.8E-08 for residential and commercial. The Acute and Chronic values for all target organs did not exceed 1.0. The values are presented in the Risk Assessment in the appendix.

Evaluation & Rule Review

Rule 212 (c)(1):This section requires a public notice for all new or modified permit units that emit air contaminants located within 1,000 feet from the outer boundary of a school.

No public notice is required since no school is located within 1,000 ft from the above site.

Rule 212 (c)(2):This section requires a public notice for all new or modified facilities that have on-site emission increases exceeding any of the daily maximums as specified by Rule 212(g).

The proposed project will result in a small emission increase for the entire facility. A Rule 212(c) (2) notice will not be triggered since the emission increase is below the daily maximum specified in Rule 212(g).

Rule 212(c)(3):This section requires a public notice for all new or modified permit unit with increases in emissions of toxic air contaminants

listed in Table I of Rule 1401 resulting in MICR greater than 1E-6 per permit unit or greater than 10E-6 per facility.

The proposed project will result in an emission increase of toxic emissions associated with the combustion of natural gas. However, as discussed in additional detail in the evaluation, the toxic emissions from this equipment will not result in an increase in MICR of more than 1 x 10^{-6} nor a hazard index greater than 1.0. Public notice is not required under this section of the rule.

Rule 212(g): This section requires a public notice for all new or modified sources that result in emission increases exceeding any of the daily maximums as specified by Rule 212(g).

The emission increase due to the replacement of the boiler is negligible and the following summarizes the emission increase:

	Maximum Daily Emissions					
	ROG	NO_x	PM_{10}	SO_2	CO	Pb
Emission increase	0	0	0	0	0	0
MAX Limit (lb/day)	**30**	**40**	**30**	**60**	**220**	**3**
Compliance Status	Yes	Yes	Yes	Yes	Yes	Yes

No public notice is required since the emission increase is below the thresholds.

Rule 401: With proper operation and maintenance compliance with this rule is expected.

Rule 402: With proper operation and maintenance compliance with this rule is expected.

Rule 407: With proper operation and maintenance compliance with the 2000 PPMV CO limit is expected.

Rule 409: Estimated PM emissions 0.05 lbs PM/hr with a flue gas of 81,760scfh.

= 0.05lbs PM/hr(7000gr/lb)/(81,760scf/hr)
= 0.0043 gr/scf

With proper operation and maintenance compliance with the 0.1 gr/scf PM limit is expected.

Rule 1146 This facility is a NOX RECLAIM facility and is subject to the NOX emission requirements of Reg 20. This boiler is still subject to the CO limits set forth by this rule and will comply with a CO emission guarantee of less than 100 ppmv. Compliance with this rule is expected.

REGULATION XIII: Though Northrop Grumman is a NOx RECLAIM facility, compliance with Reg. XIII is still required since the proposed project will result in an increase in VOC and PM10 emissions. The increase in these non-RECLAIM pollutants are as follows:

VOC (lb/day)	PM10 (lb/day)
0.08	0.086

RULE 1303(a)(1): BACT for CO from watertube boiler is defined as the use of a low-NOx burner emitting no more than 100 ppmv CO. The boiler will be operated with an ultra low-NOx natural-gas fired burner. The burner is designed to operate at 9 ppm of NOx or less and 100 ppm of CO or less. Source test condition will be imposed on the permit requiring the applicant to demonstrate compliance with the CO limit.

RULE 1303(b)(1): Modeling for CO or PM is not required since the hourly emissions are less than the allowable limits.

Modeling Analysis	CO (lb/hr)	PM10 (lb/hr)
Hourly Emissions	0.516	0.05
Allowable Limit	25.9	2.8

RULE 1303(b)(2): The proposed project will result in negligible PM10 and VOC emission increase. Emission offsets are not required.

RULE 1303(b)(4): The facility is expected to be in full compliance with all applicable rules and regulations of the District.

RULES 1303(b)(5)(A) & 1303(b)(5)(D): The proposed project does not qualify as a major modification at a major polluting facility. Further, the proposed project is exempt from CEQA according to the responses Northrop Grumman provided on Form 400-CEQA for this project. Their responses in “Review of Impacts Which May Trigger CEQA” on Form 400-CEQA were all marked “No”.

RULE 1303(b)(5)(B): The Increase in emissions associated with the proposed addition of the boiler does not qualify as a major modification at an existing major polluting facility.

RULE 1303(b)(5)(C): A modeling analysis for plume visibility is not required since the net emission increase from the proposed project does not exceed 15 ton/yr of PM10 or 40 ton/yr of NOx.

40CFR60 Subpart Dc: Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units:

The requirements of this subpart are not applicable to the proposed unit since it is rated at less than 10 mmbtu/hr.

40CFR63 Subpart DDDDD: National Emission Standards for Hazardous Air Pollutants: Industrial, Commercial, and Institutional Boilers and Process Heaters:

Watertube boilers rated at less than 10 mmbtu/hr are classified as small units. However, since the facility is not a major HAP source, the requirements of this regulation are not applicable to the proposed boiler.

Rule 1401: Toxics: Rule 1401 contains the following requirements:

1) *(d)(1) MICR and Cancer Burden* - The cumulative increase in MICR which is the sum of the calculated MICR values for all toxic air contaminants emitted from the new, relocated or modified permit unit will not result in any of the following:
   (A) an increased MICR greater than one in one million (1.0×10^{-6}) at any receptor location, if the permit unit is constructed without T-BACT;
   (B) an increased MICR greater than ten in one million (1.0×10^{-5}) at any receptor location, if the permit unit is constructed with T-BACT;
   (C) a cancer burden greater than 0.5.

2) *(d)(2) Chronic Hazard Index* - The cumulative increase in total chronic HI for any target organ system due to total emissions from the new, relocated or modified permit unit will not exceed 1.0 at any receptor location.
3) *(d)(3) Acute Hazard Index* - The cumulative increase in total acute HI for any target organ system due to total emissions from the new, relocated or modified permit unit will not exceed 1.0 at any receptor location.

Toxic emissions from external combustion subject to Reg 14 Based on the Risk assessment performed using the Risk Assessment Module, this boiler passed Tier 2 modeling. The MICR values were determined to be 3.58E-07 and 3.80E-08 for residential and commercial. The Acute and Chronic values for all target organs did not exceed 1.0. The values are presented in the Risk Assessment in the appendix.

REG XX Northrop Grumman is a NOx cycle 1 RECLAIM facility. The proposed boiler will be classified as a NOx process unit. The water tube boiler is equipped with a low nox burner. They will comply with the BACT requirements of 9 ppmv NOx and CO concentrations of 100 ppmv.

RULE 2005: Northrop Grumman is a NOx RECLAIM facility. The proposed project will result in a slight increase in NOx emissions. For this reason, compliance with Rule 2005 must be achieved prior to issuing a permit for the proposed project.

RULE 2005(c)(1)(A): The boiler will be operated with an ultra low-NOx natural-gas fired burner. The burner is designed to operate at 9 ppm of NOx or less and 100 ppm of CO or less. The boiler is expected to operate in compliance with BACT through the use of the ultra low-NOx burner. BACT for this boiler is defined as use of a low-NOx burner emitting no more than 9 ppm.

RULE 2005(c)(1)(B): Modeling is not required since the estimated hourly NOx emissions of 0.078 lb/hr does not exceed the allowable limit of 0.47 lb/hr. The proposed project will not result in a significant increase in the air quality concentration for NO_2.

RULE 2005(c)(2): This boiler is to replace an existing 6.5 mm btu/hr boiler under D91 and since the NOx emissions have been reduced, the replacement will result in a NOx reduction. No additional offsets will be required.

RULE 2005(g)(1): Statewide compliance certification is not required since the proposed project will not result in an increase of 1 pound or more of NOx emissions and therefore does not qualify as a major modification at major polluting facility.

RULES 2005(g)(2) & 2005(g)(3): The proposed project does not qualify as a major modification at a major polluting facility. Further, the proposed project is exempt from CEQA according to the responses Northrop Grumman provided on Form 400-CEQA for this project. Their responses in "Review of Impacts Which May Trigger CEQA" on Form 400-CEQA were all marked "No".

RULE 2005(g)(4): A modeling analysis for plume visibility is not required since the net emission increase from the proposed project does not exceed 40 ton/yr of NOx.

REGULATION XXX:

This facility is in the RECLAIM program. The proposed project is considered as a "de minimis significant permit revision" for non-RECLAIM pollutants or hazardous air pollutants (HAPs), and a "minor permit revision" for RECLAIM pollutants to the RECLAIM/Title V permit for this facility.

Non-RECLAIM Pollutants or HAPs

Rule 3000(b)(6) defines a "de minimis significant permit revision" as any Title V permit revision where the cumulative emission increases of non-RECLAIM pollutants or HAPs from these permit revisions during the term of the permit are not greater than any of the following emission threshold levels:

Air Contaminant	Daily Maximum (lbs/day)
HAP	30
VOC	30
NOx*	40
PM10	30
SOx*	60
CO	220

* Not applicable if this is a RECLAIM pollutant

To determine if a project is considered as a "de minimis significant permit revision" for non-RECLAIM pollutants or HAPs, emission increases for non-RECLAIM pollutants or HAPs resulting from all permit revisions that are made after the issuance of the Title V renewal permit shall be accumulated and compared to the above threshold levels. This proposed project is the 1st permit revision to the Title V renewal permit issued to this facility on June 8, 2010. The following table summarizes the cumulative emission increases resulting from all permit revisions since the Title V renewal permit was issued:

Revision	HAP	VOC	NOx*	PM10	SOx	CO
1st permit revision; addition of: A/N 517347 Boiler (device no. D337) A/N 515758 increase phosphoric acid content of D314 & D315 from 46wt% to 55wt% in condition A433.2 A/N 515759 increase acid concentrations of D281(HF from 13wt% to 16wt%, Nitric Acid from 53wt% to 60wt%), D282(Nitric Acid from 45wt% to 60wt%), D286(NITRIC Acid from 45wt% to 60wt%) & D290(HCl from 19wt% to 25wt%). A/N 515760 increase nickel concentrations in D296 & D297 from 0.1wt% to 0.5wt% in condition A433.4. A/N 515761 increase the concentrations of D280(Cr from 1 wt% to 2 wt%), D317 (Add 10 wt% hydrofluoric acid), D319(Nitric Acid from 28wt% to 35wt%), D320 (Nitric Acid from 28wt% to 35wt% and add sodium fluoride and trisodium phosphate), D321 (Nitric Acid from 45wt% to 50wt%) & D325(Sulfuric Acid from 20wt% to 40wt%)	0 0	0 0	0* 0*	0 1.0	0 0	0 0
Cumulative Total	0	0	0*	1.0	0	0
Maximum Daily	30	30	40*****	30	60	220

* RECLAIM pollutant, not subject to emission accumulation requirements

Since the cumulative emission increases resulting from all permit revisions are not greater than any of the emission threshold levels, this proposed project is considered as a "de minimis significant permit revision" for non-RECLAIM pollutants or HAPs.

RECLAIM Pollutants

Rule 3000(b)(12)(A)(v) defines a "minor permit revision" as any Title V permit revision that does not result in an emission increase of RECLAIM pollutants over the facility starting Allocation plus nontradeable Allocations, or higher Allocation amount which has previously undergone a significant permit revision process.

Since NOx is a RECLAIM pollutant for this facility, a separate analysis shall be made to determine if the proposed permit revision is considered a "minor permit revision" for RECLAIM pollutants. The replacement of the boiler will result in a decrease in NOx emissions due to the low-NOx burner. As a result, this proposed project is considered as a "minor permit revision" for RECLAIM pollutants.

RECOMMENDATION

The proposed project is expected to comply with all applicable District Rules and Regulations. Since the proposed project is considered as a "de minimis significant permit revision" for non-RECLAIM pollutants and a "minor permit revision", for RECLAIM pollutant, it is exempt from the public participation requirements under Rule 3006 (b). A proposed permit incorporating this permit revision will be submitted to EPA for a 45-day review pursuant to Rule 3003(j). If EPA does not raise any objections within the review period, a revised Title V permit will be issued to this facility.

Conclusion:

The Boiler will operate in compliance with all District Rule and Regulations. A Permit to Construct is recommended for application number 517347 subject to preceding conditions.

The plating operations will operate in compliance with all District Rule and Regulations. A Permit to Construct is recommended for application number 515758-515761 subject to preceding conditions.